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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,270	09/09/2004	Jung-Hoon Shin	5204-052	4870
20575 7590 05/21/2007 MARGER JOHNSON & MCCOLLOM, P.C. 210 SW MORRISON STREET, SUITE 400 PORTLAND, OR 97204			EXAMINER BOLDA, ERIC L	
			ART UNIT 3663	PAPER NUMBER
			MAIL DATE 05/21/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/507,270

Applicant(s)

SHIN ET AL.

Examiner

Eric Bolda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                         |                                                                             |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____                                                             | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 9, 2007 has been entered.

### *Response to Arguments*

2. Applicant's arguments filed March 9, 2007 have been fully considered and they are addressed in the new rejection below.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims recite "A top-pumped optical thin-film device.." but the words "thin" or "film" do not appear anywhere in the specification or previously filed claims

***Claim Rejections - 35 USC § 103***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delaveaux (US Pat. No. 6,043,929) in view of Abdelkader (US Pat. No. 5,555,127) and further in view of Lawrence (US Pat. No. 6,236,793).

With regard to claim 1, Delaveaux discloses in Fig. 3 or alternatively in Fig. 4, a thin film optical amplifier comprising

- a lower cladding layer,
- a gain medium structure (36),(38),(40),(42), (44) formed on the lower cladding layer, wherein the middle portion (40) of the gain medium overlapping the pump beam, has a larger cross-sectional area than the other portions of the gain medium
- an upper layer

The gain medium is excited by absorbing pump light at wavelength  $\lambda_p$ , which is incident on the larger area portion (40) of the gain medium. Delaveaux does not specifically disclose that the upper cladding (the one non-adjacent the pump, corresponding to applicant's lower cladding) is formed on a substrate. However, Abdelkader teaches (Abstract) that an optical amplifier is fabricated on a single substrate. It would have been obvious to one skilled in the art (e. g. an optical engineer) to mount the optical amplifier of Delaveaux on a substrate as in Abdelkader for the advantage of increased

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optical stability. Neither Delaveaux nor Abdelkader specifically teach that the pump light source is externally disposed above the gain medium, based on the substrate being the bottom. However, Lawrence teaches in Fig. 5 an optical channel waveguide amplifier that comprises a gain medium (core (12)) formed on a lower cladding layer (14); the gain medium core is pumped by absorbing pumping light from light source (60). Note that although in Lawrence there is no designated substrate, the additional cladding layer of silicon (upper portion of (14), see Table I) is configured in the same way as the silicon substrate in Abdelkader (3<sup>rd</sup> col. lines 55-56). (Again, Lawrences figure 5 must be turned upside down to correspond to Applicant's labeling of layers). Therefore it would have been obvious to one skilled in the art (e. g. an optical engineer) to pump the optical amplifier of Delavaux, mounted on a substrate as in Abdelkader, with the pump external to the waveguide, directing light through the cladding, e. g. downwards, as taught in Lawrence, for the advantage of allowing efficient coupling of the signal and a high power pump into the core (Lawrence, 4<sup>th</sup> col. lines 35-37). In response to Applicant's argument that although the device of Abdelkader may include an integrated (not external) pump, this reference is only cited for its teaching of a substrate layer upon which the cladding and gain medium layers are formed.

With regard to claim 2 the lower cladding layer (14) of Lawrence transmits the light irradiated from the pumping light source.

With regard to claim 3, the gain medium inherently exhibits amplification (i. e. non-absorption) in the signal wavelength band  $\lambda_s$ , but exhibits great absorption in the pump wavelength band  $\lambda_p$ , in order to maintain population inversion of the excited state.

With regard to claim 7, Lawrence teaches laser diode as a pumping light (7<sup>th</sup> col. lines 3-5).

With regard to claim 8, the gain medium structure of Delaveaux includes adiabatic portions (38) and (42) between the portion with larger area (40) and the other portions (36), (44).

With regard to claim 9, it would be obvious to one skilled in the art at the time of invention to place the pumping light source so that it contacts the surface of the cladding layer, to avoid losses due to reflection at the cladding-air interface.

6. Claims 4, 6, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delaveaux, in view of Abdelkader and Lawrence as applied to claims 1-3 and 7-9 above, and further in view of Garito (US Pat. App. No. 2003/0234978).

With regard to claims 4 and 10, Delaveaux, Abdelkader, and Lawrence disclose all the elements of the claim, except that the gain medium is made of a silica-based substance doped with excited elements and nano-crystals. However, Garito teaches optical waveguide amplifiers (Fig. 2) with a core (32) comprising polymer host matrix doped with excited elements (Er) and nanoparticles. The host matrix may include silica, i. e. be silica based [para. 0069]. It would have been obvious to one skilled in the art (e. g. an optical engineer) to use the optical waveguide of Garito in the optical amplifier of Delaveaux as modified by Abdelkader for the purpose of shortening the length of the gain medium and ease of integration with other optical components [para. 0015]. Note that the pumping light in Lawrence is directed upward (Applicant's direction, downward) without a waveguide on the substrate.

With regard to claim 6, the optical amplifier of Garitor produces amplification by means of stimulated emission from rare-earth elements in an excited (pumped) state .

With regard to claim 11, the larger area of the gain medium structure is horizontal (parallel to the cladding) in Delavaux. The pump light is transmitted vertically in Lawrence.

Note that the citations made herein are done so for the convenience of the applicant; they are in no way intended to be limiting. The prior art should be considered in its entirety.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Wasserbauer, Goldberg.

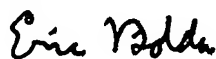
8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink that reads "Eric Bolda". The signature is written in a cursive, slightly slanted style.

Eric Bolda